

## A. OBJECTIVES: YR' 2004-2009

### 1. PROVIDE 'OPERATIONAL' DATA STREAM:

- SST
- SEA LEVEL PRESSURE
- NEAR SURFACE VELOCITY
- WINDS, WAVES AND PRECIPITATION

### 2. ENHANCE RESEARCH PROGRAMS ON OCEAN PROCESSES AND MODELING:

- ONR, NSF, NASA SATELLITE CALIBRATIONS
- NOPP MODEL VERIFICATIONS
- SOUTH ATLANTIC, ... CALIFORNIA CURRENT

### 3. SUPPORT INTERNATIONAL OCEAN SCIENCE PROGRAMS:

- CLIVAR
- GODAY
- GLOBAL WARMING

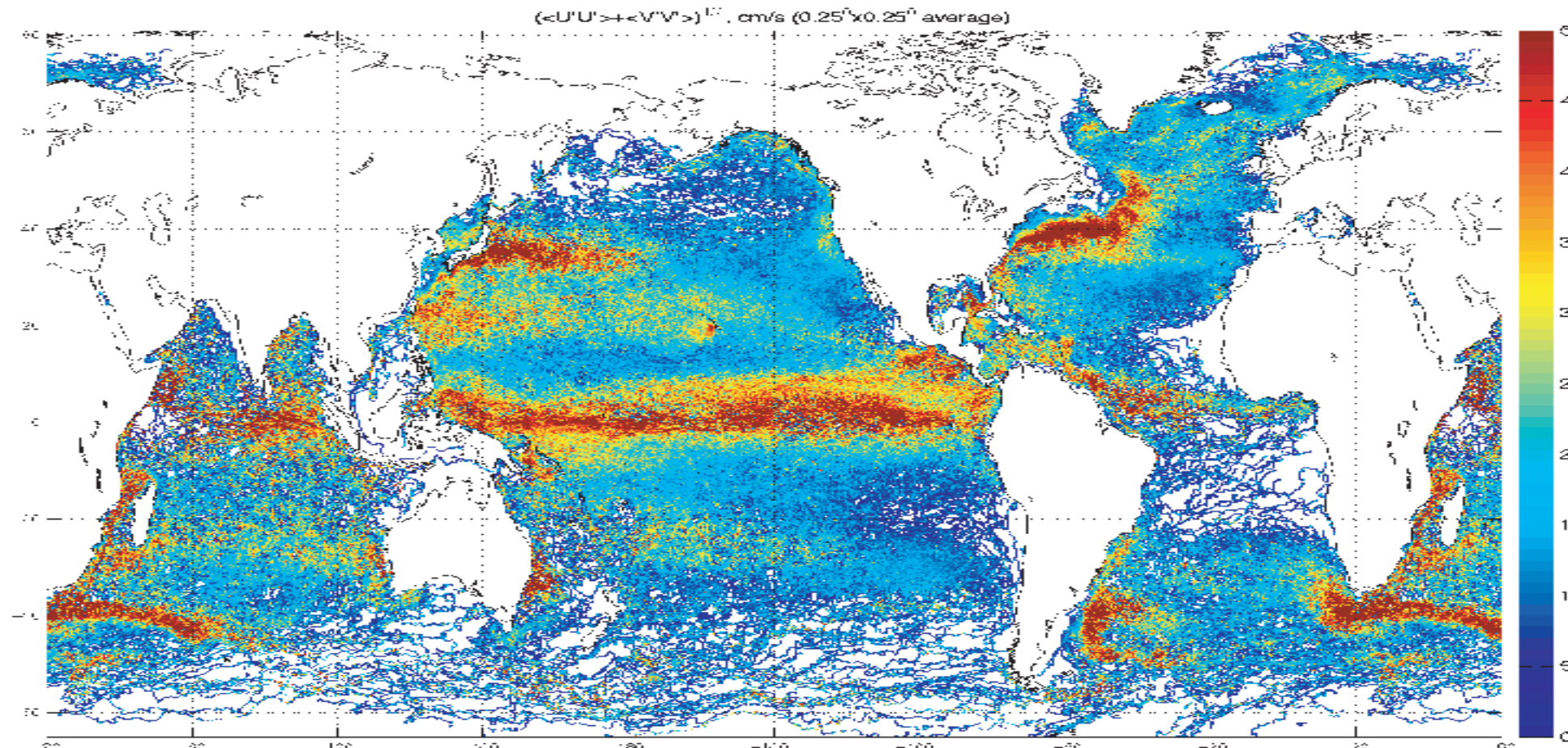


Figure 1. High spatial resolution (1/4 x 1/4 degree) rms surface eddy velocity of the global ocean determined from drifter data 1978 - 2003.

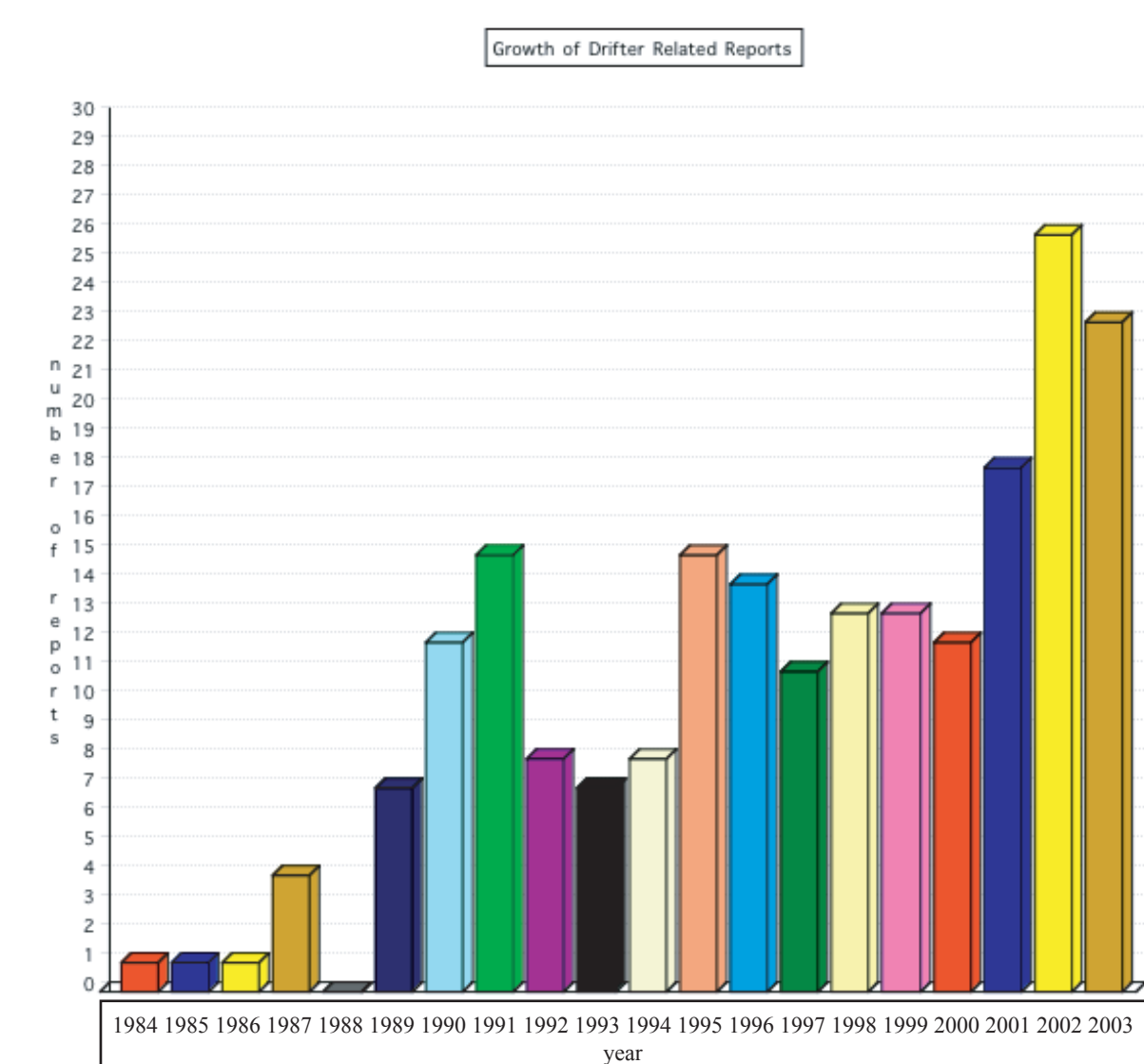
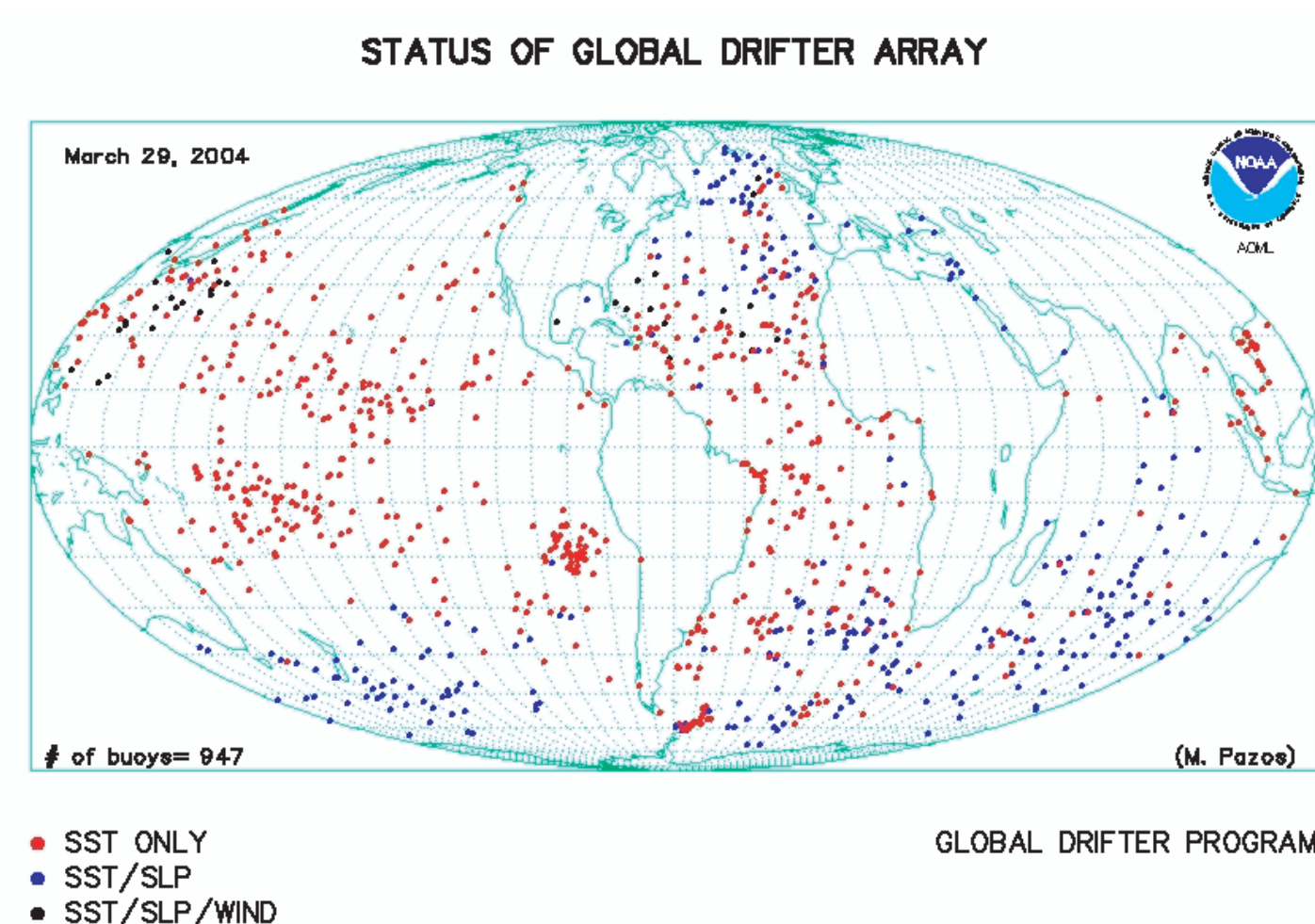


Figure 2. The number of refereed publications that have used global drifter data sets or technology developed under GDP as a function of calendar year. Year 2003 represents publications as of October 30, 2003.

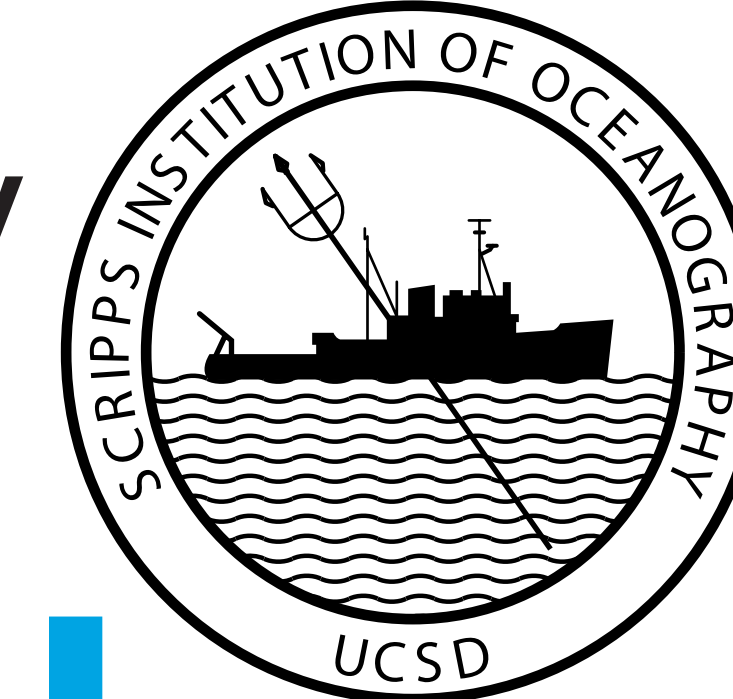


(LEFT) Figure 3. The global SVP drifter population map of 947 drifters on March 29, 2004. On April 24, 2003 there were 740 drifters in the global array.

# GLOBAL DRIFTER PROGRAM

Peter Niiler

## THE JOINT INSTITUTE OF MARINE OBSERVATIONS (JIMO/NOAA) of AOML / Scripps Institution of Oceanography



## B. IMPLEMENTATION: YR' 2004-2009

### 1. DEVELOP AND ADD SENSORS TO DRIFTERS

- WIND DIRECTION AND SPEED
- SEA SURFACE SALINITY
- GEOCHEMICAL SENSORS - ALPS
- DEPLOYMENT METHODOLOGY IN HURRICANES

### 2. IMPROVE DRIFTER MANUFACTURING METHODS:

- LOW VOLTAGE ARGOS TRANSMITTERS AND CONTROLLERS
- PREASSEMBLED-VACUUM FORMED ABS DRIFTER PARTS
- SMALL DROGUES AND DEPLOYMENT PACKAGES

### 3. COMPLETE GLOBAL ARRAY

- 1250 ELEMENT SVP - SST ARRAY BY 2005
- BAROMETERS ON ALL DRIFTERS BY 2007
- 300 ELEMENT SVP - SSS ARRAY FOR AQUARIUS CALIB. BY 2007

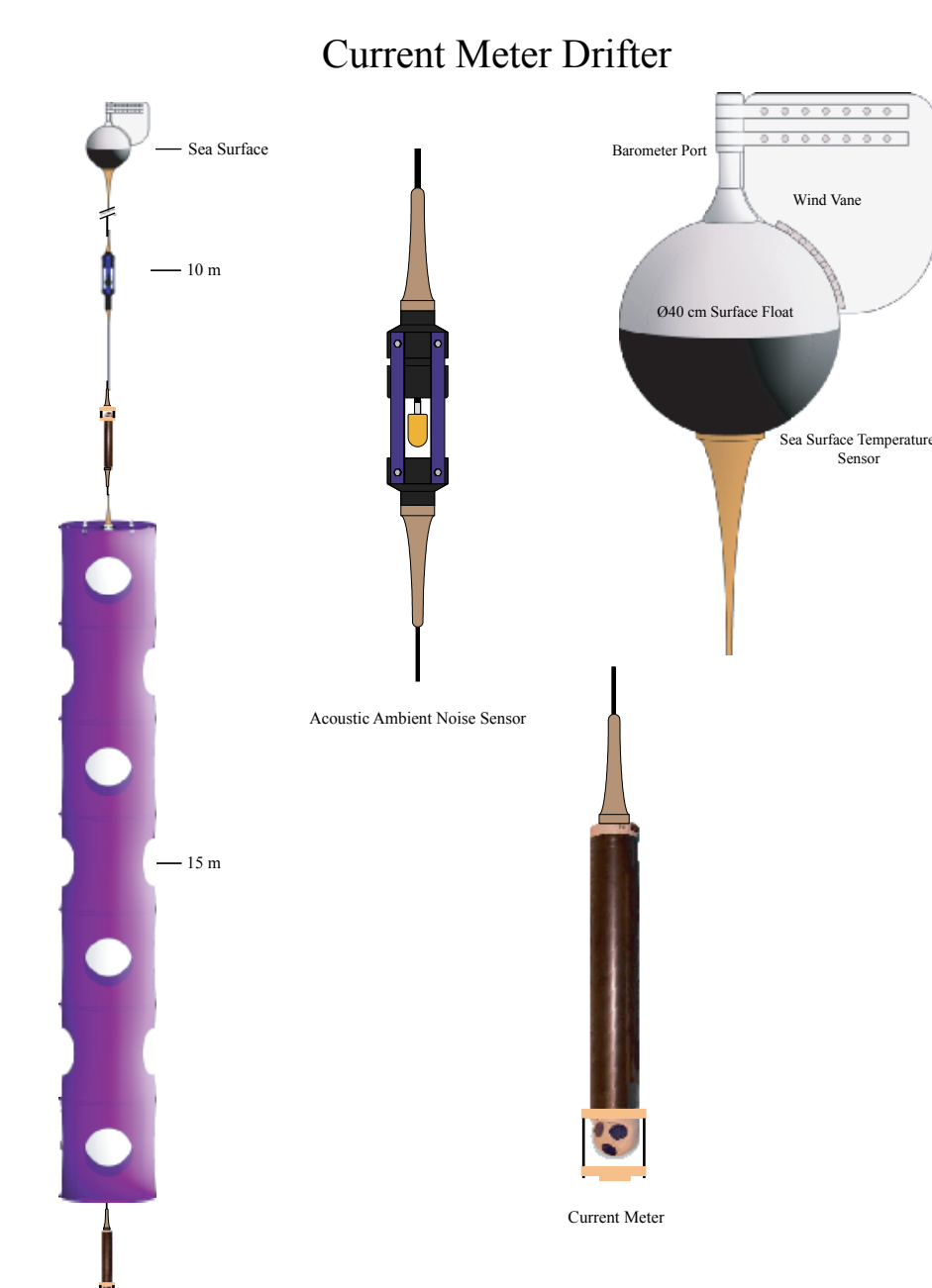


Figure 4. New current meter drifter for measuring large ocean internal waves and drifter slip in high winds.



Figure 5. Air deployment package parachuting from a C-130J aircraft.

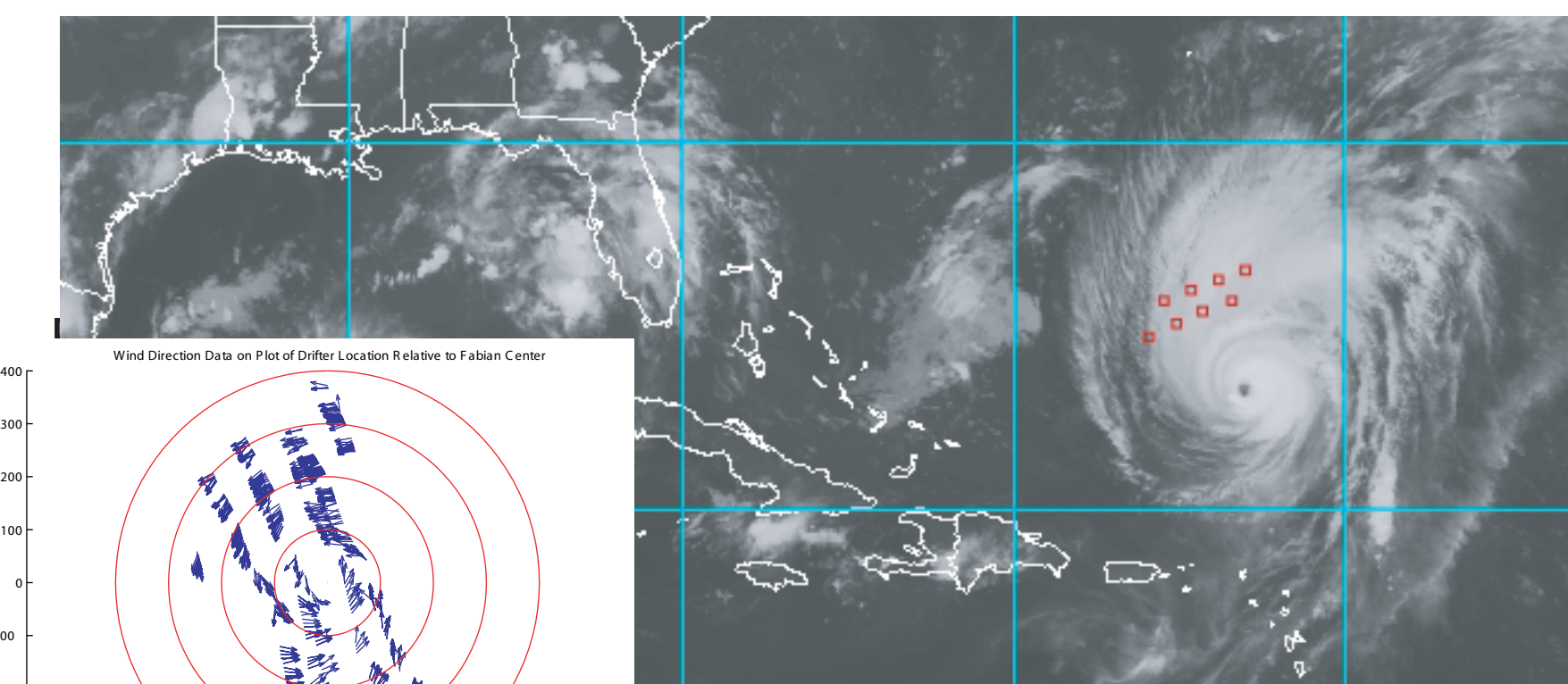


Figure 6. Initial deployment positions of Minimet drifters 18 hours in front of the center of hurricane Fabian in the tropical Atlantic

Figure 7. Wind direction measurements from Minimet buoys in hurricane Fabian.



Figure 8. Hurricane air deployment package. Box contains two Minimet drifters. The package is rigged to a parachute to allow deployment from an Air Force C-130J aircraft.

## C. RESULTS: YR' 2004

1. DRIFTER ARRAY OF 900+ SVP DRIFTERS SINCE 8/03
2. WMO SUPPORT FOR 300+ SVP-B DRIFTERS PER YEAR
3. SVP COST LOWERED FROM \$5400 in 1992 TO \$1700 in 2004
4. GLOBAL ABSOLUTE SEA LEVEL MAP AT 0.5 DEG. RES.
5. SEASONAL MAPS OF CURRENTS IN TROPICAL ATLANTIC
6. SINGLE PARTICLE DIFFUSION FOR PACIFIC
7. SUPPORT OF NOAA/NSF/NASA SOUTHERN OCEAN STUDY
8. 221 PEER REVIEW PUBLICATIONS

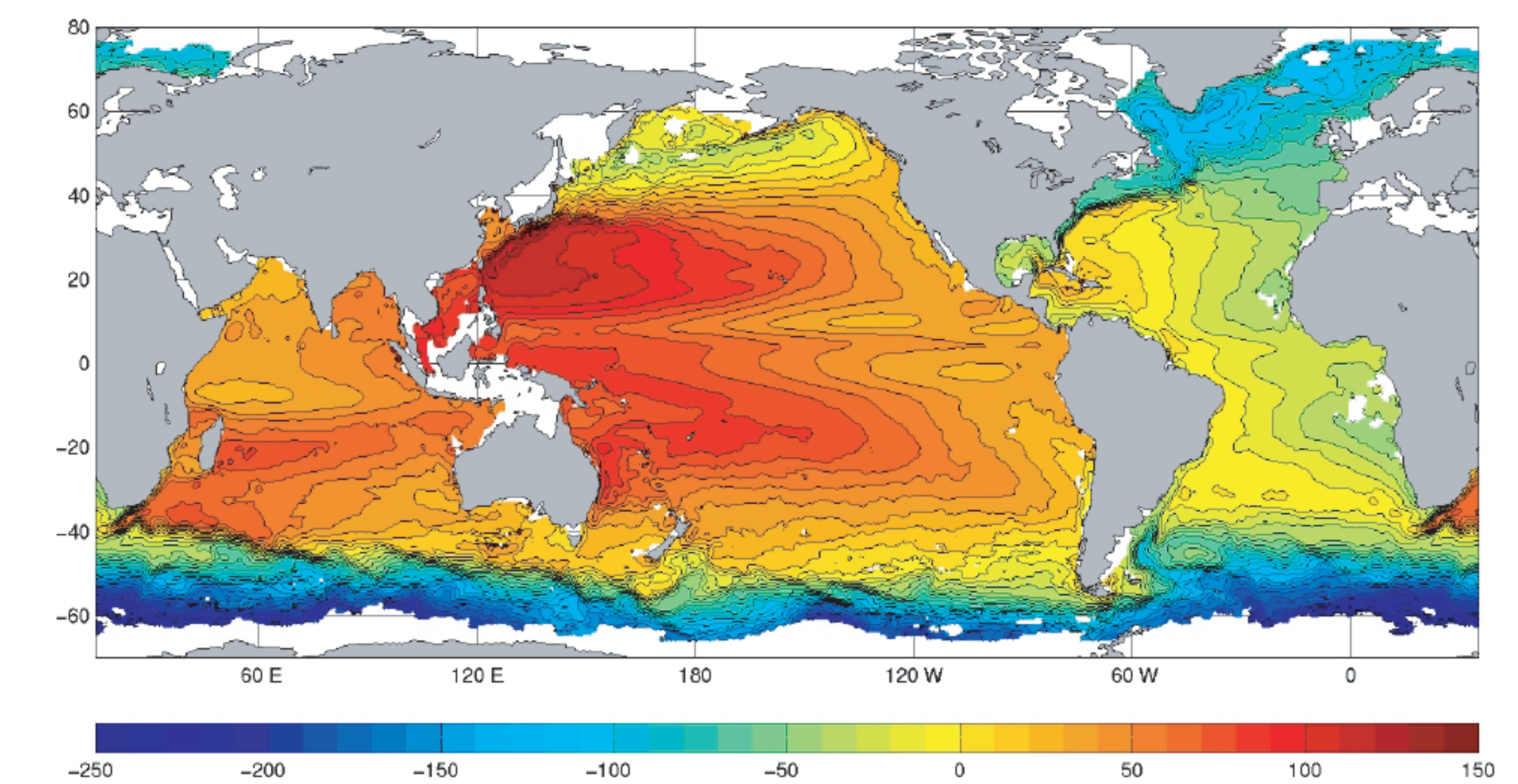
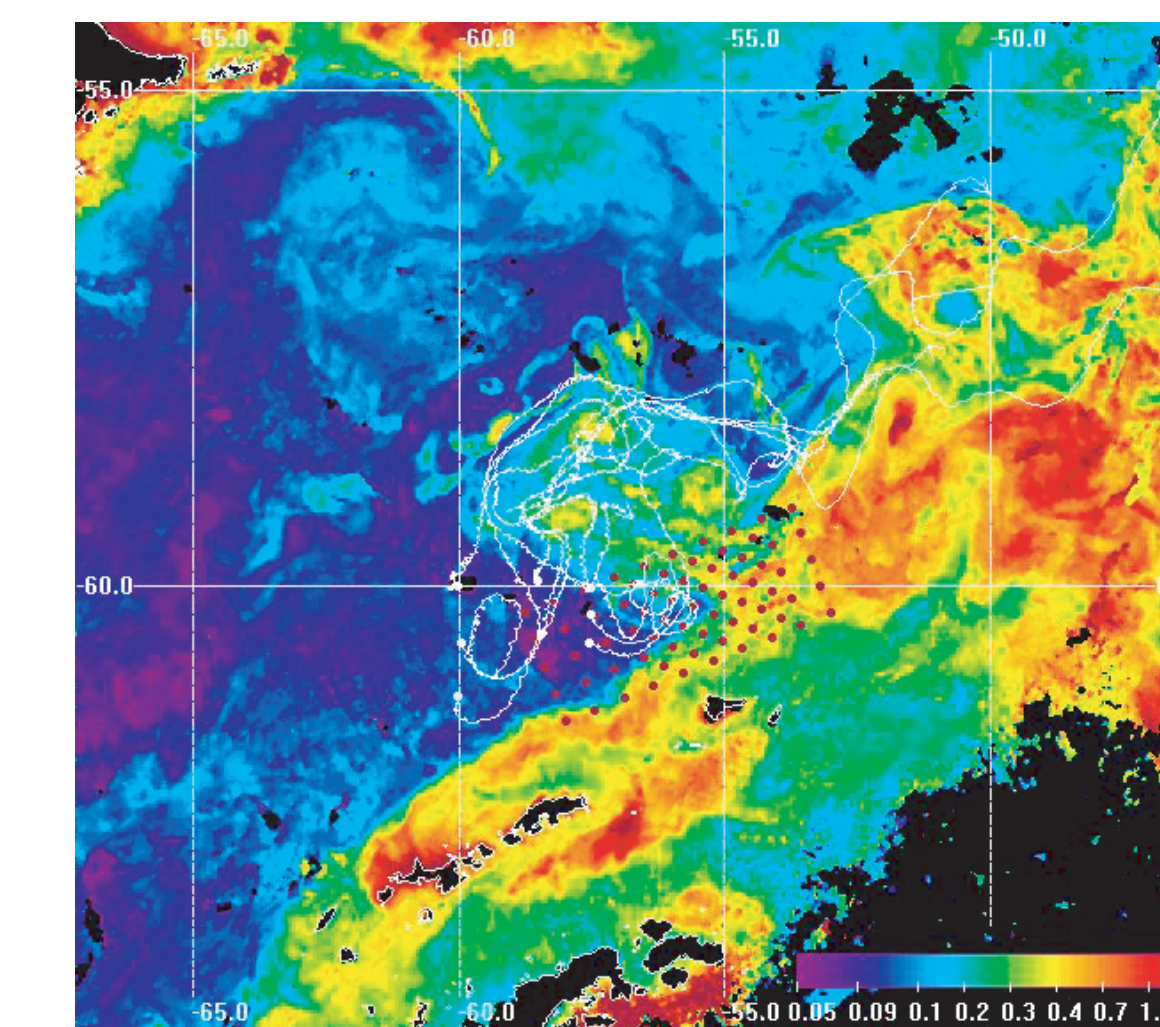
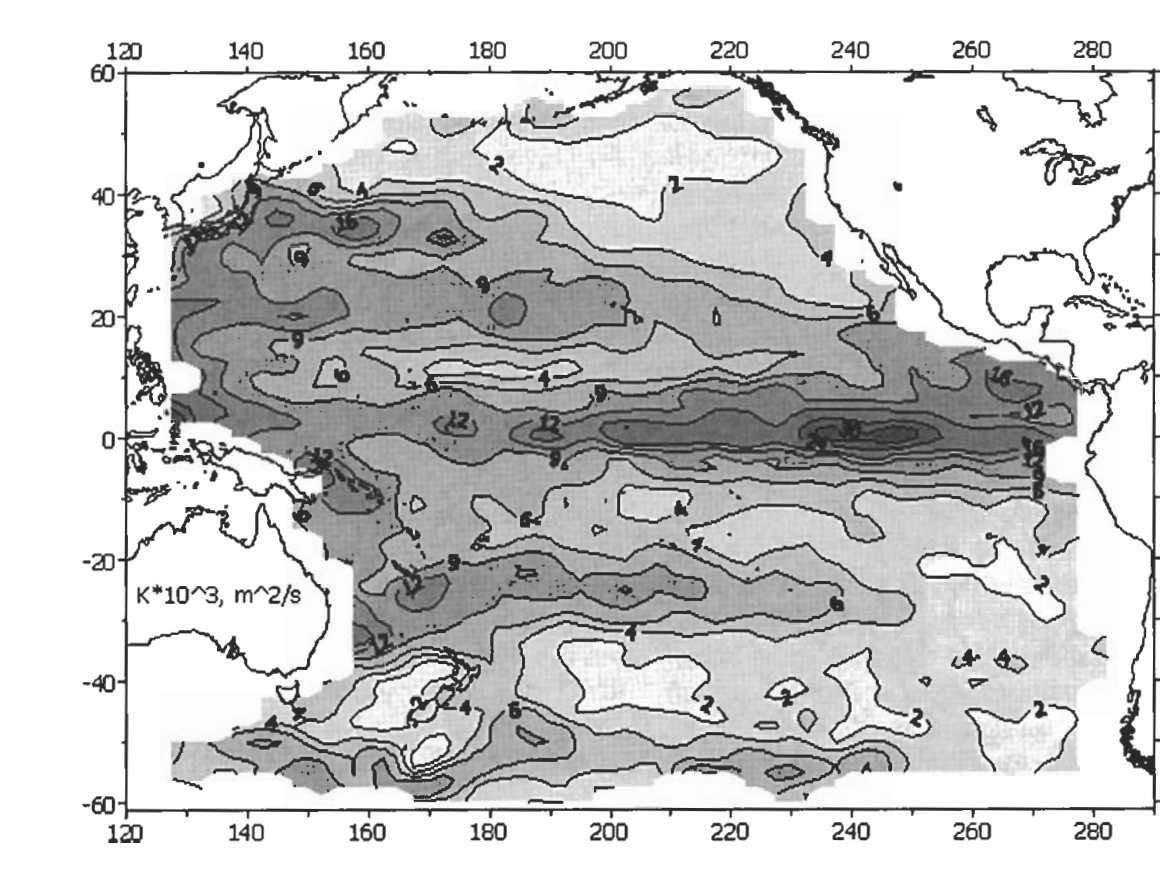


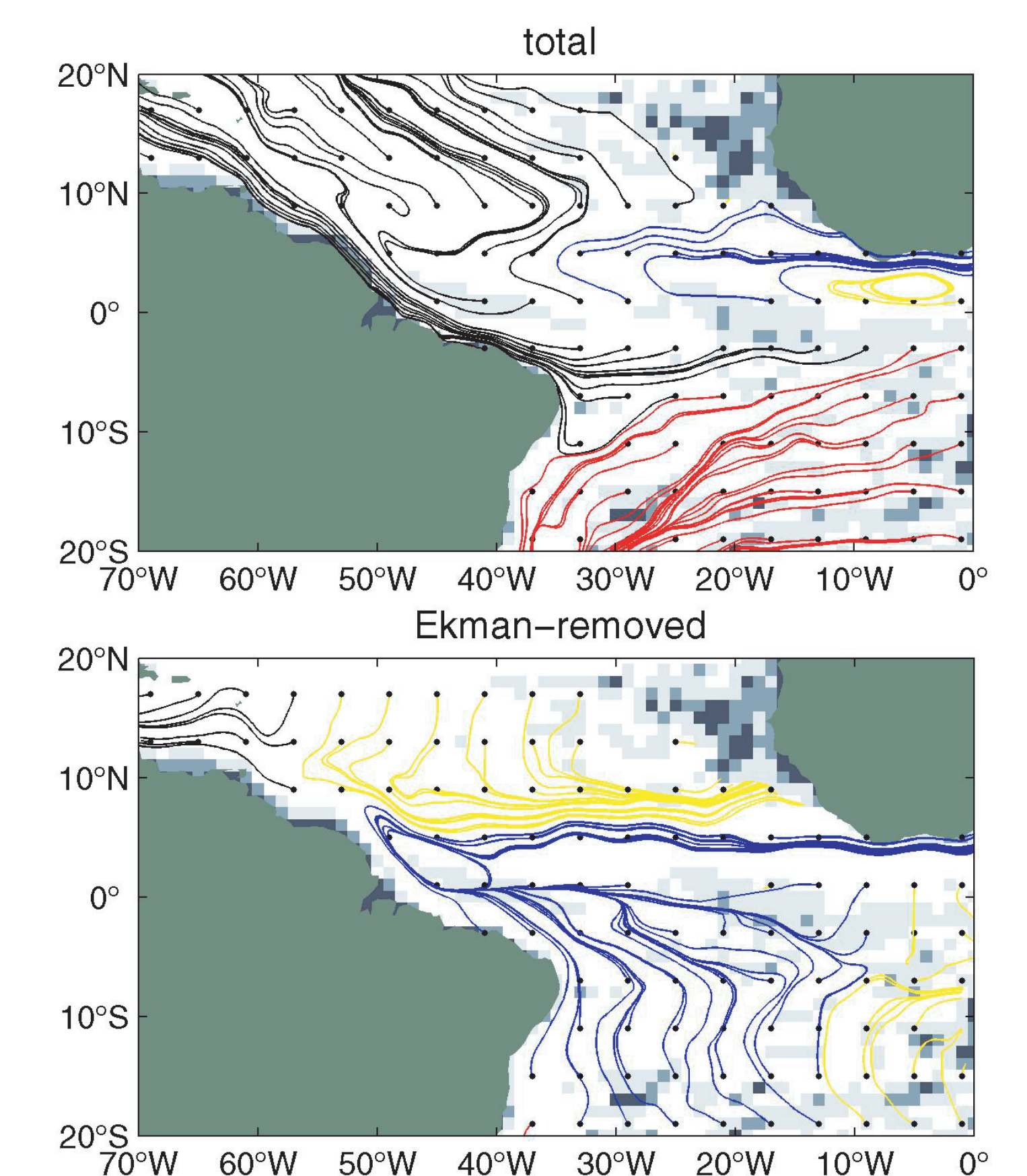
Figure 9. 1992 to 2003 time average absolute sea level of the global ocean computed from drifter data. (GRL 30, (22) 2168 to 2167 (2003))



Figures 10. Drifting buoy tracks overlain on January 2004 'ocean color' composite. (Courtesy of Mati Kharu, SIO)



Figures 11. Single particle lateral diffusivity ( $\times 10^3 \text{ m}^2/\text{sec}$  computed from Lagrangian drifter observations from 1977 to 1999. (JGR 108, 5, 3141, 2003)



Figures 12. Tropical Atlantic surface pathways of particles (upper panel) and surface particles with Ekman currents removed (lower panel). (Courtesy of Rick Lumpkin, 2004)